



PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : BARKAN et al.

Examiner: Larry D. Taylor

Serial No. : 09/880,899

Group Art Unit: 2876

Filed : June 15, 2001

For : OMNIDIRECTIONAL LINEAR SENSOR-BASED
CODE READING ENGINES

Assistant Commissioner for Patents
Washington, D.C. 20231

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AMENDMENT UNDER 37 C.F.R. §1.111

Sir:

In response to the Office Action of the U.S. Patent and Trademark Office mailed
on December 4, 2002, please amend the subject application as follows:

IN THE CLAIMS:

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Please amend Claims 1, 2, 13, 14, 21, 22 and 23 to read as follows:

1. (Amended) An apparatus for an optical code reader comprising:
a first solid state photo sensor array having cells arranged in a line along an axis of
the array for producing electronic signals corresponding to an image of at least a portion

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this Amendment and any document referred to as enclosed herein is being deposited
with the United States Postal Service as first class mail, postpaid in an envelope, addressed to the Assistant
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Dated: March 4, 2003

Adrienne Fagan
(Name of Person Mailing Envelope)

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(Signature of Person Mailing Envelope)

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of a target optical code symbol;

a second solid state photo sensor array having cells arranged in a line along an axis substantially identical to the axis of the first sensor array, said axes are oriented at an intersecting angle with respect to each other, the second sensor array for producing electronic signals corresponding to at least a portion of a target optical code symbol; and

electronic analog to digital converter means for converting electronic signals from at least one of said sensor arrays to bit content of a target optical code symbol to be read.

2. (Amended) The apparatus of claim 1 further comprising a third solid state photo sensor array having cells arranged in a line oriented at an acute angle with respect to the lines of the first and second sensor arrays.

13. (Amended) A sensor assembly for an apparatus for reading a target one-dimensional optical code symbol whose principle axis has an arbitrary orientation in a plane generally parallel to an image plane of the sensor assembly comprising:

a first solid state photo sensor array having cells arranged in a generally straight line along an axis for producing an electronic signal corresponding to at least a portion of an image of the code symbol;

a second solid state photo sensor array having cells arranged in a generally straight line along an axis substantially identical to the axis of the first sensor array for producing an electronic signal corresponding to at least a portion of an image of the code symbol;

a third solid state photo sensor array having cells arranged in a generally straight line along an axis substantially identical to the axes of the first and second sensor arrays

for producing an electronic signal corresponding to at least a portion of an image of the code symbol, wherein the axes of the first, second and third sensor arrays are oriented at an intersecting angle with respect to one another;

means for focusing images of the target code symbol on each of the three sensor arrays; and

means for converting to digital form electronic signals from the sensor assembly.

14. (Amended) The sensor assembly of claim 13 further comprising electronic means for selecting data obtained from electronic signals from the sensor array whose line is most closely aligned with the principle axis of the target code symbol.

21. (Amended) An apparatus for an optical code reader comprising:

at least three one-dimensional solid state sensor elements each having an array of cells, each array located along an axis, wherein the axes are oriented at an intersecting angle with respect to one another;

electronic analog to digital converters associated with each one-dimensional solid state sensor elements for converting electronic signals from the photo sensors to digital form; and

means for selecting a signal from one of the analog to digital converters representative of the data content of a one-dimensional target bar code whose principle axis is sufficiently aligned with the axis of the corresponding array to permit data to be extracted.

22. (Amended) The apparatus of claim 21 wherein data content from more than one of the sensor elements is combined to decode a bar code that is positioned such that only a part of the bar code is readable by each sensor element.

23. (Amended) An optical code reader comprising:

a gun-shaped housing comprising a head portion containing a sensor assembly for reading an optical code located forward of and in the vicinity of an optical axis of a sensor assembly, said sensor assembly including at least two sensor elements each having an array of cells, each array located along an axis, wherein the axes are oriented at an intersecting angle with respect to one another, said housing further comprising a handle portion sloping backwardly and downwardly from the head portion, said handle portion having a trigger for actuating the optical code reader; and

a circuit board generally perpendicular to the optical axis of the sensor assembly extending through the head portion and through at least a portion of the length of the handle portion of the housing for carrying the sensor assembly.